RESEARCH NOTES

AN INQUILINE RELATIONSHIP BETWEEN THE TAILLESS WHIP-SCORPION *PHRYNUS GERVAISII* AND THE GIANT TROPICAL ANT *PARAPONERA CLAVATA*

Tailless Whip-Scorpions (Amblypygi, Phrynidae) are widely distributed in the Neotropics, but their natural histories are poorly known (Quintero, D. 1981. J. Arachnol., 9:117-166). *Phrynus gervaisii* (Pocock) is common in moist lowland forests from Venezuela through Costa Rica, where it is often found in leaf litter, under bark and fallen trees, or between the fronds and trunk of the corozo palm, *Schellea zonensis* (Quintero, D. 1981. J. Arachnol., 9:117-166). In this paper we report possible commensalism of *P. gervaisii* with the giant tropical ant *Paraponera clavata* (F.).

In May, 1984, the western half of a 50 ha forest plot on Barro Colorado Island (Hubbell, S. and R. Foster. 1983. pp. 25-41 *In* Tropical Rain Forest: Ecology and Management; S. L. Sutton, T. C. Whitmore, and A. C. Chadwick, eds. Spec. Publ. No. 2, British Ecol. Soc., Blackwell Scientific Publications, Oxford) was surveyed for the distribution of *P. clavata* colonies at the bases of trees. *Phrynus gervaisii* was detected in the entrances to some of the 96 ant nests observed. (Only two specimens of tailless whip-scorpions were collected for identification so there remains the possibility that *Paraphrynus laevifrons*, known to occur in habitats similar to *P. gervaisii* (Quintero, per. comm.), may have been identified as *P. gervaisii*.) Re-examination of these colonies and 120 more found on the eastern half of the plot in May 1985 included behavioral observations of *P. gervaisii*. The nest entrances were examined using a flashlight; if a tailless whip-scorpion was not observed within 5-10 sec, the colony was gently disturbed with a probe, often resulting in the emergence of a tailless whip-scorpion.

Of 178 active *Paraponera* colonies examined in 1985, *P. gervaisii* was observed in 76 (42.7%) of the nest entrances. Two each were observed in the entrances of 8 nests, and immatures were present in 6. When the *P. clavata* colonies located in 1984 were recensused, 46.2% (30) of those still active had *P. gervaisii* associated with them. Only one colony that had become inactive since 1984 harbored a tailless whip-scorpion ($p < 0.001$, Binomial Test). Since we made no effort to excavate the nests and seldom remained more than 60 sec at each, our observations were probably rather conservative regarding the frequency of association between these two species.

P. gervaisii usually clung motionlessly to the sides of the entrances, out of the path of the rather large worker ants, when observed in undisturbed entrances. When disturbed ants erupted from the nest in defense, *P. gervaisii* usually remained in the sides of the entrance unless ant activity became too intense, in which case they moved to accommodate the ants. Accommodation included

lifting their long legs and body off the surface of the tunnel allowing ants to freely pass underneath. When *P. gervaisii* was gently touched they typically retreated deeper into the entrance. If ant activities blocked the nest entrance, *P. gervaisii* often moved a short distance (< 50.0 cm) up or around the trunk of the tree, where it remained motionless until the ant activity subsided. It then returned to the nest entrance and soon disappeared into the nest interior. We never saw the ants attempting to sting or bite a *P. gervaisii*, even when the ants had been disturbed into a frenzy of colony defense.

We suggest that *P. gervaisii* may opportunistically select *P. clavata* nests for diurnal refuge. These arachnids may derive protection from the well defended ant colonies. Their presence in *P. clavata* nests occurred too frequently to be accidental, particularly when they were found so rarely in inactive ant nests or other cavaties around the base of tree trunks. The close association between *P. gervaisii* and *P. clavata* may have gone largely unnoticed due to human avoidance of these large ants, whose sting is extremely painful (Hermann, H. and M. Blum. 1966. Ann. Entomol. Soc. Amer., 59:397-407; Hermann, H. and M. Douglas 1976. Ann. Entomol. Soc. Amer., 69:681-86).

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EGG PRODUCTION OF *ACHAEARANEA TEPIDARIORUM* (C.L. KOCH) (ARANEAE, THERIDIIDAE) IN THE FIELD IN JAPAN

This field survey on the egg production of *Achaearanea tepidariorum* (C. L. Koch) in Japan was made in 1984 to compare with the results of a laboratory investigation which was reported separately (Miyashita, K. 1987. J. Arachnol. 15:51-58.

The survey was conducted in a vacant house in Abiko City (140°02'E, 35°52'N), Chiba Prefecture. Adult females, which spun webs on the wall, at the edges of the verandah, and under the floor, were carefully observed and censused daily from May to September. When new females were found, they were recorded and marked with colored paint, and the dates of egg sac productions and disappearances of females themselves were recorded. Egg sacs were removed from webs on the 7th or 8th day after oviposition and kept separately in glass vials. The number of spiderlings that emerged was considered as an indicator of the number of eggs in the sac, since healthy egg sacs rarely contained non-viable eggs.